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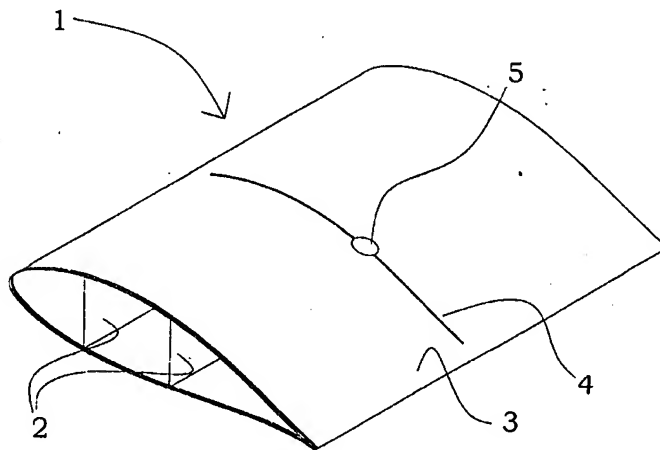
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(54) Title: A METHOD OF MANUFACTURING A BLADE FOR A WIND TURBINE AND BLADE COMPRISING SEGMENTED CONDUCTOR MEANS



(57) Abstract: A method of manufacturing a fibre-reinforced blade for a wind energy plant is presented, which blade is configured with at least a blade shell and means for conducting to a lightning current to an earth connection. Novel aspects of the method comprise that the blade is provided with segmented conductor means that are configured for conducting a lightning current outside the blade to the means for conducting to earth; and wherein the conductor means are distributed and secured at the external surface of the blade shell in such a manner that the conductor means are essentially flush with the external surface of the blade shell. When the segmented conductor means are distributed and attached at the external surface of the blade shell, the lightning current will not have to be conducted through the conductor means, but rather they are conducted in a ionised passage in the air above the conductor means.

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/77527 A (JOMITEK APS; JOHANSEN, OLUF, PETER, KAAD; SOERENSEN, TROELS) 18 October 2001 (2001-10-18) page 9, line 18 - page 10, line 17	1,14-16, 18-24
Y	page 10, line 30 - page 11, line 15 -----	5,6
X	US 6 457 943 B1 (OLSEN KAJ ET AL) 1 October 2002 (2002-10-01) cited in the application column 2, line 10 - line 43; figures 1,2 -----	1,15-20, 22,23,25
X	DE 197 48 716 C1 (AERODYN ENGINEERING GMBH, 24768 RENDSBURG, DE) 12 November 1998 (1998-11-12) column 1, line 34 - line 44; figures 1,4b,5 ----- -/--	1-3,15, 22,25



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Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 612 810 B1 (OLSEN KAJ ET AL) 2 September 2003 (2003-09-02) column 3, line 55 - column 4, line 39 column 5, line 33 - line 40 -----	1,22
Y	US 4 237 514 A (CLINE ET AL) 2 December 1980 (1980-12-02) figures 2,3 column 2, line 40 - column 3, line 18 -----	5
Y	EP 1 011 182 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 21 June 2000 (2000-06-21) paragraphs '0014!', '0035!', '0004!' - '0050! -----	6
A	US 2 982 494 A (AMASON MYRON P) 2 May 1961 (1961-05-02) column 4, line 34 - line 42 -----	5,15
A	US 5 841 066 A (BOCHERENS ET AL) 24 November 1998 (1998-11-24) column 3, line 17 - line 27 -----	5,10,15, 20
A	EP 0 718 495 A (AUTOFLUG ENERGIETECHNIK GMBH + CO) 26 June 1996 (1996-06-26) column 5, line 49 - column 6, line 6 -----	1-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal

Application No

PCT/DK2005/000014

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0177527	A	18-10-2001	AU 4828301 A	23-10-2001
			WO 0177527 A1	18-10-2001
			EP 1272759 A1	08-01-2003
			US 2004130842 A1	08-07-2004
US 6457943	B1	01-10-2002	DK 112798 A	10-03-2000
			AT 244363 T	15-07-2003
			AU 5504399 A	27-03-2000
			CN 1120298 C	03-09-2003
			DE 69909306 D1	07-08-2003
			DE 69909306 T2	22-04-2004
			WO 0014405 A1	16-03-2000
			EP 1112448 A1	04-07-2001
			ES 2203171 T3	01-04-2004
			PT 1112448 T	28-11-2003
DE 19748716	C1	12-11-1998	NONE	
US 6612810	B1	02-09-2003	DK 88199 A	22-12-2000
			AT 248293 T	15-09-2003
			AU 5390500 A	09-01-2001
			CA 2377485 A1	28-12-2000
			CN 1359450 A ,C	17-07-2002
			DE 60004831 D1	02-10-2003
			DE 60004831 T2	17-06-2004
			WO 0079128 A1	28-12-2000
			EP 1187988 A1	20-03-2002
			NO 20016263 A	15-02-2002
US 4237514	A	02-12-1980	NONE	
EP 1011182	A	21-06-2000	EP 1011182 A1	21-06-2000
US 2982494	A	02-05-1961	GB 902268 A	01-08-1962
US 5841066	A	24-11-1998	FR 2745124 A1	22-08-1997
			CA 2197705 A1	16-08-1997
			DE 69702785 D1	21-09-2000
			EP 0790182 A1	20-08-1997
EP 0718495	A	26-06-1996	DE 4445899 A1	27-06-1996
			DE 19501267 A1	29-08-1996
			EP 0718495 A1	26-06-1996